



Comparison of surgical treatments for mucous cysts of the distal interphalangeal joint

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Mucous cysts of the interphalangeal joints are common. Several surgical techniques have been described, but none has proven to be superior. We compared three techniques that entail complete removal of the cyst together with the concomitant osteophytes. In group A wound closure was obtained by full thickness skin graft, in group B by primary closure and in group C by a local skin graft. Sixty-four patients with 70 cysts were reviewed. An overall recurrence rate of 8.6% was observed. Forty-five of the studied patients received a full thickness skin graft (4 out of 45 recurred), 23 were closed primarily (2 out of 23 recurred) and 2 by a local skin graft (no recurrences). Full thickness skin graft showed no significant higher recurrence compared to primary closure. Full thickness skin graft showed no significant higher pain or satisfaction compared to primary closure. Patients with a recurrent cyst were less satisfied and had more pain than those without recurrences.

Keywords : finger ; mucous cysts ; tumor ; full thickness skin graft ; distal interphalangeal joint ; surgery ; hand.

INTRODUCTION

Mucous cysts of the interphalangeal joint are common and mostly appear in the distal interphalangeal (DIP) joint (11,22). This has been observed

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significantly more in women than in men (4,13,21,22,28).

The ganglion arises due to leakage of joint fluid into the dermis where a cyst is formed (3). This leakage is caused by a herniation of the joint capsule (25). The capsule is possibly abraded and damaged by the arising osteophytes during the aging process which causes the capsule to herniate at points of weakness, causing leakage of joint fluid at the site of lowest resistance (8). Herniation is often associated with osteoarthritis of the joint (4,11,22,24).

Mucous cysts are considered pseudocysts, since they do not contain a true (epithelial) lining (25).

Patients seek treatment because of pain and cosmetic disturbance. Moreover, skin-perforation due to minimal trauma might occur which can result in septic arthritis (6).

Many conservative and surgical treatment-options are available, however due to variable success rates none has proven to be superior (Table I, II). In 1969 Constant compared the outcome of

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Table I. — Outcome of conservative treatment

Article	Number of cysts	Recurrence rate	Therapy	Follow-up time
Rizzo	80	40%	3:1 dilution of 1% lidocaine without epinefrine and betamethasone	> 2 years (mean 5.9 years)
Epstein	6	100%		
Goldman	41	68%	Triamcinolone 10 mg/ml	
Sung	12	8%	0.5% sodium tetradecyl sulfate	18.3 months (mean)
Cordoba	5	0%	3% polidocanol	6 months (mean)
Dodge	28	36%	steroid	5.1 years (mean)

Table II. — Outcome of different surgical treatments

Article	Number of cysts	Recurrence rate	Therapy	Follow-up time
Lawrence	26	8%	Simple cyst excision	8 months (mean)
Crawford	25	28%	Simple cyst excision	20 months (mean)
Arner	20	35%	Simple cyst excision	
Constant	12	25%	Simple cyst excision	
de Berker	47	6%	Ligation of cyst pedicle	8 months (mean)
Hoshino	6	0%	Ligation of cyst pedicle with evacuation	
Gingrass & Brown	20	0%	Osteophyte removal with cyst and skin intact	3 years (mean)
Eaton	44	2%	Cyst- and osteophyte removal with primary closure	6 months-10 years
Rizzo	83	0%	Cyst- and osteophyte removal with primary closure	> 2 years (mean 5.9 years)
Kasdan	113	2%	Cyst- and osteophyte removal with primary closure	> 6 months
Crawford	12	8%	Cyst- and osteophyte removal with rotation graft	19 months (mean)
Dodge	18	28%	Cyst- and osteophyte removal with rotation graft	7.5 years (mean)
Johnson	69	1%	Cyst- and osteophyte removal with local skin graft	> 6 months (mean 38 months)
Kleinert	36	0%	Cyst- and osteophyte removal with local skin flap	12-18 months
MacCollum	22	0%	Cyst- and osteophyte removal with tongue-shaped local skin flap	
Young	6	0%	Cyst- and osteophyte removal with bilobed flap	12-19 months (mean 15 months)
Imran	6	0%	Cyst- and osteophyte removal with rhomboid flap	6 months
Constant	30	3%	Wide excision with full thickness skin graft	
Jamnadas-Khoda	51	4%	Cyst- and osteophyte removal with full thickness skin graft (Wolfe)	4-6 months

simple cyst-excision with primary closure to wide excision with the use of a full thickness skin graft. This resulted in recurrence rates of respectively 25% (3 out of 12) and 3% (1 out of 30) (4). Since 1969, a survey of 51 cases has been done by Jamnadas-Khoda *et al* to study the use of full

thickness skin graft. With a recurrence rate of 4%, this confirmed the good results of Constant, however no comparison was made with primary closure (19).

Our goal of this study is to compare the success rates of three techniques that entail complete removal of the cyst together with the concomitant

osteophytes. These techniques differ in closure of the wound. In group A wound closure was obtained by full thickness skin graft, in group B by primary closure and in group C by a local skin graft.

MATERIAL AND METHODS

In a retrospective analysis of all patients treated at our Hand Unit with surgical mucous cyst removal between June 2000 and May 2011, 64 treated patients with 71 mucous cysts on the distal interphalangeal joint were included. The patients who received previous surgical treatment at the same digit were excluded from the study. We reviewed these patients with a mean follow-up of 5 years and 7 months (range 15 months to 13 years).

Preoperative radiographic signs of osteoarthritis were researched for all patients and a comparison was made to see if significant differences of success rate were noticed between the groups with present and absent signs of osteoarthritis.

All patients were contacted by phone by the first author in order to assess pain and satisfaction and to check for recurrent disease. Pain and satisfaction were both assessed with a Likert 10-point scale. Also patients were asked the question if they would undergo the same treatment again.

All patients who mentioned cyst recurrence were invited for clinical, radiographic and if needed ultrasound examination. These patients were examined by the first and the senior author (HB and ID).

Significance of results was tested with the Student-t test. A result was concluded significant when its p-value was below 0.05.

Surgical technique

The surgical procedures were all carried out under loco regional anesthesia. After careful dissection, the cyst was removed in toto. If osteophytes were present as determined on the preoperative radiograph, these were removed with a rongeur. After this, the wound was closed primarily or, if a skin defect was present or the skin was too thin to suture, a Patton skin graft (full thickness skin graft from the ulnar border of the hand) or a local skin graft (a local manipulation of skin to cover the defect) was used. The surgical interventions were performed by the two senior authors (ID, LDS).

Ethical approval was received from the Ethical Committee of the University Hospitals Leuven. The data collection and patient contacts were handled according

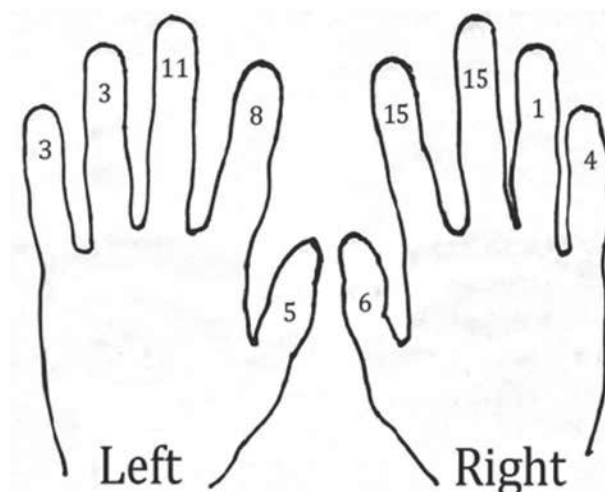


Fig. 1. — Distribution of cysts

to the ethical standards in the 1964 Declaration of Helsinki.

RESULTS

Forty-eight of the patients were women and 16 were men. The age ranged from 44 to 87 (mean age 64). Thirty cysts were located on the left hand and 41 on the right. Figure 1 displays the distribution of cysts over the digits. One patient died due to unrelated causes before the time of data collection.

Sixty-three of the cysts were fully cured, but for 7 treated cysts the patient indicated a recurring prominence. Of these 7 patients, 2 agreed to come to the hospital for clinical examination: in 1 patient a recurring cyst was confirmed. In the other patient, radiograph and ultrasound demonstrated no recurrence of the cyst, but the prominence was caused by osteophytes. We thus assumed that 6 cysts may have recurred (8.6% recurrence rate).

Thirty-nine of 71 cysts (55%) had preoperative radiographic signs of osteoarthritis. Of the 6 recurring cysts, 3 had osteoarthritic changes of the joint, showing that no significant difference in success rate is expected with or without osteoarthritic changes of the joint.

Forty-five of the cysts were treated with a full thickness skin graft, of which 4 recurred. This shows a recurrence rate of 8.9% for full thickness

Table III. — Pain and satisfaction of recurred and non-recurred cysts

	Mean (SD)	
	No recurrence (n = 64)	Recurrence (n = 6)
Pain	0.56 (1.58)	2.80 (3.35)
Satisfaction	8.63 (2.17)	1.17 (2.86)

skin grafts, compared to a 8.7% recurrence rate (2 out of 23 cases) after primary closure, which means no significant difference is observed. Two joints were covered by a local skin flap (no recurrences). One recurrence was treated with puncture and steroid injection, but the cyst recurred shortly after. The values of the mean and the standard deviation for pain and satisfaction in recurred and recurrence-free patients are displayed in table III. Table IV shows the values of the mean and the standard deviation for satisfaction and pain from patients who were treated with a full thickness skin graft compared to patients whose wounds were closed primarily.

Patients with a recurrence were less satisfied and had more pain than those without recurrences (p-value < 0.001 and p = 0.004 Student t-test respectively). There is no significant difference in satisfaction and pain between patients with a full thickness skin graft and those with primary closure.

One patient in the group of full thickness skin graft suffered from a post-operative infection of the wound, which resulted in loss of the fingernail.

DISCUSSION

Numerous treatment options for interphalangeal cysts have been suggested. Some controversy remains on recurrence rates in conservative treatment methods. The outcome of several surveys on treatment by injection are mentioned in table I.

Cryotherapy is available in many institutions, however this treatment is painful with a risk of significant scarring (2,7,17). CO₂ laser therapy showed very good results (no recurrence) in a small study of 10 patients with a follow up of 14 to 44 months (17). A success rate of 86% was reported with infrared coagulation in a study of 23 patients, but a risk for

Table IV. — Pain and satisfaction of cysts treated with full thickness skin graft and primary closure

	Mean (SD)	
	Full thickness skin graft (n = 45)	Closed primarily (n = 23)
Pain	0.93 (2.11)	0.39 (1.16)
Satisfaction	7.56 (3.32)	8.83 (2.37)

surrounding tissue damage and blistering was mentioned (25).

Also in surgery, different options are available with similar controversy on outcome and recurrence. The results of surveys with different surgical approaches are displayed in table II.

Complications after surgical removal of mucous cysts are not unfrequent: extension lack of the interphalangeal joint, infection, nail deformity, joint deviation, numbness, stiffness, residual swelling and recurrence (13). Rizzo reported an infection rate of 3.6% in 83 cases, Kasdan 2% in 113 cases. Fritz 3% in 86 cases and Jamnadas-Khoda et al. reported no post-operative infections in 51 cases (13,19,21,27). In our series we encountered 1 infection in 71 surgical procedures (1%) which resulted in loss of the fingernail. This result corresponds with the infection rate in other surveys mentioned above.

Strengths of our study are the number of cysts, the comparison between surgical treatment methods and the high response rate. Another strength is that we measured the satisfaction and pain of the patients with a 10-point Likert-scale. Although patient rated outcome measurements, can cover subclinical recurrence, mucous cysts as a benign pathology are only treated on the patients' demand. Therefore, the success of the treatment is primarily defined by the cysts' clinical absence and the patients' satisfaction (9).

Since varying results of many surgical treatment methods are available, it is hard to conclude which one is the most effective. Furthermore, it is important that the results of these surgical treatments are compared to conservative treatment. Most surveys report a higher success rate of surgical treatment compared to success rates of conservative treatment from literature. However, the comparison of different surgical methods remains challenging, since

they are performed by different surgeons under different circumstances. Here, we compared our results of 3 types of surgery with literature results of both conservative and surgical treatment. In our series, there was no randomization on surgical technique and grafts are often used if the cyst is larger in size or the skin is of worse quality possibly due to osteophytes. Therefore, a lower success rate could have been expected.

The results of this survey demonstrate that primary closure or a full thickness skin graft, after surgical removal of mucous cysts and osteophytes, are both effective treatment options. There is no statistical evidence that recurrence was lower with skin graft. Moreover no difference in pain and satisfaction was observed between full thickness skin graft and primary closure.

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